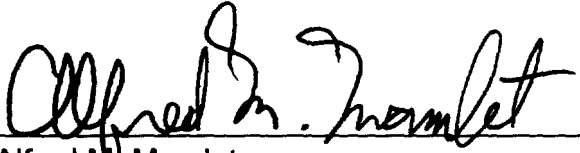


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Before the
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C.

In the Matter of)	
)	IB Docket No. 95-22
)	RM-8355
Market Entry and Regulation of)	RM-8392
Foreign-Affiliated Entities)	
)	

Statement of Paul W. MacAvoy
on Behalf of
Telefonica Larga Distancia de Puerto Rico, Inc.

1. My name is Paul W. MacAvoy and I am the Williams Brothers Professor of Management Studies at the Yale School of Management. Previously I was Dean of the Yale School as well as Dean and John M. Olin Professor at the William E. Simon Graduate School of Business Administration, University of Rochester. In addition, I was the Luce Professor of Public Policy at the Massachusetts Institute of Technology in the 1970s, and was the Steinbach Professor of Organization and Management and later the Beinecke Professor of Economics at Yale in the early 1980s. I hold M.A. and Ph.D. degrees in economics from Yale University, and my A.B. degree as well as an honorary doctorate are from Bates College. I was elected to the American Academy of Arts and Sciences in 1981.

2. The focus of my professional work has been regulation and strategic decision making by firms in the energy, transportation, and communications industries. I have written numerous journal articles as well as sixteen books, including my most recent book *Industry Regulation and the Performance of the American Economy* (W.W. Norton 1992). In addition, I have been a member of the editorial boards of several journals and was the founding editor of the

Bell Journal of Economics and Management Science. My research in regulatory economics has been cited by the United States Supreme Court in four cases and by lower federal courts in more than twenty cases. My research in the area of communications has been cited on fourteen occasions by the Federal Communications Commission.

3. A considerable part of my career has been devoted to public service. From 1965-66, I was a staff economist on the President's Council of Economic Advisers and also served as a member of President Johnson's Task Force on the Antitrust Laws. During the Ford Administration, I served as a member of the President's Council of Economic Advisers and was co-chairman of the President's Task Force on Regulatory Reform. President Carter appointed me to the Council of the Administrative Conference of the United States, and President Reagan appointed me to his National Productivity Advisory Committee. Additional work in Washington has included fellowships at both the Brookings Institution and the American Enterprise Institute. I currently serve as chairman of the Advisory Board to AEI's Telecommunications Policy Project.

4. In addition to holding these public positions, I have been on the board of directors of several corporations, including (currently) Alumax Corporation, LaFarge Corporation, the Chase Manhattan Corporation, and the Chase Manhattan Bank. Previously my directorships have included American Cyanamid Corporation, Colt Industries, Inc., Combustion Engineering, Inc., Columbia Gas, and the United States Synthetic Fuels Corporation.

5. I have served as an expert and testified in numerous antitrust and regulatory proceedings, as listed in the attached curriculum vitae (Appendix One). In 1978-1982, I conducted studies of pricing strategies in regulated long-distance service markets for AT&T that were presented in a statement to the Federal Court conducting the antitrust proceeding that led to the 1984 divestiture of the Regional Bell Operating Companies from AT&T.

6. In July 1994, I filed an affidavit in United States District Court in Washington, D.C. on behalf of Bell Atlantic Corp., BellSouth Corp., NYNEX Corp., and Southwestern Bell Corp. that provided an assessment of competition in markets for interstate long-distance telecommunications. In January 1995, I filed an affidavit in United States District Court in

Washington, D.C. on behalf of Pacific Telesis Group that analyzed competition in long-distance services originating or terminating in California, as well competition in the provision of interLATA calls within California.

I. INTRODUCTION AND SUMMARY

7. On February 17, 1995, the Federal Communications Commission ("FCC" or "Commission") issued a Notice of Proposed Rulemaking ("NPRM") regarding the entry of foreign-affiliated entities into United States international telecommunications markets. I have been asked by Telefonica Larga Distancia de Puerto Rico, Inc. ("TLD") to assess the economic effects on international telecommunications services if the Commission's NPRM were adopted as proposed. The NRPM's basic position was that "unrestricted foreign-carrier facilities-based entry is not in the public interest when United States carriers do not have effective opportunities to compete in the provision of services and facilities in the foreign carrier's primary markets."¹ The NPRM requested comment on its proposal to deny foreign carrier applications to enter the United States and offer facilities-based, international outbound services unless the foreign carriers could demonstrate "that effective market access is, or will soon be, available to United States carriers seeking to provide basic, international telecommunications facilities-based services in the primary markets served by the carrier desiring entry."²

8. If adoption of the NPRM prevented foreign carriers from entering United States international markets on a facilities basis, United States outbound consumers would be denied the benefits of such entry. These benefits could be large or small depending on the competitiveness of

¹ See FCC, Notice of Proposed Rulemaking, IN THE MATTER OF MARKET ENTRY AND REGULATION OF FOREIGN-AFFILIATED ENTITIES, IB Docket No. 95-22, at ¶ 1.

² *Id.* at ¶ 2.

United States international markets for outbound telecommunication services. The less competitive these markets are, the greater the benefits to United States consumers from facilities-based entry by foreign carriers.

9. Entry by new firms into a market in which price exceeds the competitive level generally has the effect of lowering the price as firms compete for customers. As price falls towards the competitive level, consumer surplus, which equals the difference between what individuals are willing to pay for the service and what they actually pay, increases. If competition succeeds in driving the price of a service down to the competitive level, then firms' prices equal their marginal costs (the change in their total costs that occurs when they change the quantity supplied by a small amount). At this point, the market is in competitive equilibrium, which maximizes consumer surplus and guarantees that firms earn no more than the competitive rate of return on their investments.

10. In contrast to competitive markets, monopoly markets result in prices above the competitive level, which reduces consumer surplus. Monopoly prices may exist because only one firm supplies the entire market, or because a set of firms agrees through tacit or explicit collusion to restrain from engaging in price competition. In addition to lowering consumer surplus by forcing individuals to pay more for services, monopolistic prices also prevent some customers from purchasing services they would choose to buy at competitive prices. This creates deadweight welfare losses caused by the fact that scarce resources of supply go unused even though at competitive prices those resources would be employed in producing services for willing buyers.

11. This statement offers an assessment of the competitiveness of United States outbound markets for standard international message toll service ("IMTS") and discount IMTS, which are purchased primarily by residential and small-business customers, as well as international wide-area telecommunications services ("IWATS"), which are purchased primarily by business customers. Section II defines the set of outbound United States international markets and reports firms' market shares and market concentration indices. Section III examines hypotheses as to the

relationship of market concentration to competitiveness of pricing. Attention is focused on how price-cost margins (equal to the difference between price and marginal cost, divided by price) are determined by market concentration. This section also analyzes whether structural conditions in international markets supported the ability of carriers to establish prices in a tacitly collusive manner during the 1990s. Section IV presents data on prices and marginal costs, which are used to calculate price-cost margins. The study's key findings regarding hypotheses as to the relationship between market concentration and price-cost margins are reported in this section. A brief summary of my conclusions is contained Section V.

12. My primary findings regarding competition in markets for international telecommunications services originating in the United States are as follows:

- Concentration indices declined in outbound United States international markets in the 1990s, but still remain at high levels. The declines predictably should have led to lower price-cost margins in outbound United States markets for standard IMTS, discount IMTS, and IWATS services if firms set prices in a competitive manner.
- Evidence of the effect of market concentration on price-cost margins over time in a sample of important outbound United States markets shows that essentially all margins increased in the 1990s despite declines in market concentration. This evidence supports a finding of tacit collusion in outbound markets for standard IMTS, discount IMTS, and IWATS services.
- Evidence of market concentration and price-cost margins across country-pair markets at a single point in time also supports a finding of tacit collusion. Price-cost margins are not lower in country-pairs with lower market concentration, which supports a finding of tacit collusion.
- Price-cost margins for IMTS and IWATS in essentially all outbound United States markets exceeded 0.70, which is a higher level than found in other highly concentrated industries in the United States.
- Given the current lack of competition in these United States outbound telecommunications markets, facilities-based entry by foreign-affiliated carriers has the potential to make these markets more competitive.

II. ANALYZING THE EXTENT OF COMPETITION IN INTERNATIONAL TELECOMMUNICATIONS MARKETS

A. Market Definition

13. The first step in the analysis of the competitive nature of United States international telecommunications markets is to define the product and geographic dimensions of those markets. The extent to which firms set prices competitively or collusively can only be determined by analyses of prices in specific markets. The two primary products considered here are IMTS and IWATS. IMTS services are primarily used by low-volume, residential and small business customers, while IWATS services are primarily used by high-volume business customers. IMTS is not a good substitute for IWATS for high-volume business customers; neither is IWATS a good substitute for IMTS for low-volume residential customers. IMTS prices exceed IWATS prices at high usage levels, while IWATS prices exceed IMTS prices at low usage levels. The two services are not substitutes but rather separate products. An additional service examined below is discount IMTS service, in which carriers' charge a fixed monthly fee and then offer lower rates per minute. Discount IMTS plans offer lower rates than standard IMTS to customers making a sufficiently large number of calls.

14. With respect to the geographic dimensions of markets, consider a customer desiring to place a call from the United States to Canada. For that customer, the option to call a number in Germany is not a good substitute. Therefore, specific country pairs form relevant markets for international outbound calls from the United States. With this in mind, a set of foreign destination countries have been specified here to which United States customers place a large volume of calls. A total of eight foreign countries were chosen, which constituted eight of the top nine foreign destinations for United States originated calls and accounted for approximately 55

percent of total outbound United States international calls.³ In order from largest to smallest, these country pairs and the 1993 volume of minutes billed in the United States are shown in the following table.

TABLE ONE
SELECTED COUNTRY PAIRS AND
VOLUME OF MINUTES BILLED IN THE UNITED STATES

United States to:	Thousands of Minutes Billed
Canada	2,493,082
Mexico	1,398,807
United Kingdom	799,805
Germany	572,449
Japan	397,230
France	263,575
Dominican Republic	253,347
Italy	229,594

B. Market Shares and Market Concentration

15. The next step in an analysis of the competitiveness of United States international telecommunications markets is to determine the carriers' market shares and calculate indices of market concentration. The market shares for AT&T, MCI, and Sprint and the combined share for

³ The excluded country was South Korea, which ranked eighth in 1993. See STATISTICS OF COMMUNICATIONS COMMON CARRIERS, 1993/1994 Edition.

all other facilities-based carriers in each of the eight country pairs are reported in Tables One to Eight of Appendix Two, along with Table Nine of Appendix Two which shows the identity of every carrier offering facilities-based service in the selected international markets.⁴ Attention is focused on AT&T, MCI, and Sprint because in these eight country pairs, their combined market share always exceeds 94 percent, although the market concentration indices use market shares for all facilities-based carriers.

16. Information regarding the number and relative sizes of carriers in these international markets is summarized in a well-known index of market concentration, the Herfindahl-Hirschman Index ("HHI").⁵ The HHI equals the sum of the squared shares of firms' sales, so that a single-firm market (monopoly) yields an HHI equal to 1.0, while a market with two equal-sized firms has an HHI of 0.5, and a market with a large number of firms yields an HHI near zero. The reciprocal of the HHI equals the number of equal-sized firms that yield the same level of market concentration. For example, an HHI of 0.5 results from $1/0.5$ or two equal-sized firms, and an HHI of 0.33 results from $1/0.33$ or three equal-sized firms. According to the *Horizontal Merger Guidelines* of the United States Department of Justice and the Federal Trade Commission, a market with an HHI in excess of 0.18 (equivalent to 5.5 equal-sized firms) is considered highly concentrated; a market with an HHI between 0.10 (equivalent to 10 equal-sized firms) and 0.18 is considered moderately concentrated; and a market with an HHI less than 0.10 is

⁴ The FCC does not collect data on carriers' revenues by type of service, e.g., IMTS or IWATS. Therefore, the market shares represent carriers' shares of total international toll services for outbound calls from the United States to a specific foreign country.

⁵ The HHI can be presented in two alternative forms: as having values between zero and one or as having values between zero and ten thousand. This statement uses the former method because comparisons are made to price-cost margins, which also lie between zero and one. The *Horizontal Merger Guidelines* of the United States Department of Justice and the Federal Trade Commission use the latter method.

considered unconcentrated for purposes of evaluating the competitive effects of horizontal mergers.

17. As shown in Table Two, the HHIs were at or near one in 1985, indicating AT&T's monopoly position (data for Canada and Mexico were not collected by the FCC prior to 1991).⁶ Market concentration, as measured by carriers' outbound revenues, fell in these eight country pairs over the period 1985 to 1993.

TABLE TWO
HERFINDAHL-HIRSCHMAN INDICES FOR SELECTED COUNTRIES

U.S. to:	1985	1986	1987	1988	1989	1990	1991	1992	1993
Canada	n/a	n/a	n/a	n/a	n/a	n/a	0.51	0.44	0.42
Mexico	n/a	n/a	n/a	n/a	n/a	n/a	0.64	0.59	0.55
UK	0.91	0.78	0.73	0.68	0.61	0.57	0.54	0.52	0.50
Germany	1.00	1.00	1.00	0.86	0.73	0.68	0.67	0.62	0.56
Japan	1.00	0.96	0.80	0.71	0.64	0.57	0.56	0.52	0.43
France	1.00	0.89	0.69	0.66	0.61	0.56	0.54	0.52	0.49
Dominican Republic	1.00	0.95	0.93	0.97	0.82	0.73	0.70	0.67	0.52
Italy	1.00	0.97	0.83	0.76	0.71	0.65	0.64	0.60	0.56

18. The six HHI series for which complete data were available show somewhat different patterns of decline. In the United Kingdom, Italy, and Japan, HHIs declined at a fairly steady rate over the period, while in Germany and the Dominican Republic, the indices remained

⁶ Market share data were obtained from the FCC's *Section 43.61 International Telecommunications Data Report* (various years).

at or near one for several years before declining. In contrast, the HHI for France fell rapidly from 1985 to 1987 and then declined at a more gradual rate. By 1993, HHIs ranged from 0.42 for Canada (the equivalent of 2.4 equal-size firms) to 0.56 for Germany and Italy (the equivalent of 1.8 equal-size firms). Even the lowest HHI, 0.42, is substantially more than twice the 0.18 benchmark for a highly concentrated market. The HHIs and market share statistics indicate that MCI and Sprint grew during the 1990s at the expense of AT&T,⁷ so that market shares of the three firms became more equal. This fact has important ramifications regarding the ability of the three firms to establish prices in a cooperative manner, as discussed below.

III. PRICE-COST MARGINS, CONCENTRATION, AND MARKET PERFORMANCE IN INTERNATIONAL TELECOMMUNICATIONS MARKETS

19. In this section, I review what economic theory has to say regarding how firms' price-cost margins (price minus marginal cost, divided by price) are determined by market concentration. The discussion is general in nature and focuses on broad predictions of the theory rather than detailed forecasts of how market concentration determines exact levels of price-cost margins in particular country-pair markets. The section also analyzes whether market conditions in outbound United States international markets would likely support the ability of carriers to set prices in a tacitly collusive manner.

20. The competitive interactions of firms in a market can be distinguished according to three types of behavior. First, firms may cooperate, by colluding either explicitly or tacitly, to achieve profits at or near the joint, profit-maximizing outcome obtained by a monopolist. Price-cost margins vary inversely with the elasticity of demand,⁸ because the more customers reduce

⁷ Canada, Japan, and the Dominican Republic are the only countries where facilities-based carriers other than AT&T, MCI and Sprint accounted for more than three percent of the market.

⁸ The elasticity of demand indicates the degree to which customers change their purchases in response to a change in price. For example, if customers were to decrease their purchases by five (continued...)

their demands in response to a price increase, the lower is the monopolist's profit-maximizing price.⁹

21. With tacit collusion, price-cost margins remain at high levels regardless of the level of HHI. From a dynamic viewpoint, changes in HHI over time in a single market will not tend to cause changes in price-cost margins because firms in the market have tacitly agreed to restrain the "toughness" of price-setting behavior so as to earn above-competitive rates of profit. From a static viewpoint, differences in HHI across markets at the same point in time will not tend to cause differences in price-cost margins, for the same reason.

22. Second, firms may make adjustments to their competitive responses short of full cooperation, but still more accommodating than competitive firms. Behavior of this type results in prices above the competitive level but below the monopoly level. Such prices can result from non-cooperative behavior, such as the Cournot model of oligopoly. If firms in a market engage in non-cooperative behavior, the average industry price-cost margin is determined by the HHI multiplied by a term (known as the conjectural variation) indicating that firms expect their rivals to cooperate partially in restricting output, so that if a firm decreases output by one unit, other firms will decrease output by less than one unit in aggregate.¹⁰ In the extreme case, with Cournot behavior, firms expect their rivals not to cooperate in response to a reduction in output, but rather to maintain their current rates of output. If firms in a market are Cournot competitors, the average industry price-cost margin is determined by the HHI divided by the elasticity of demand.

23. If firms act as non-cooperative Cournot competitors, then dynamic market data should reveal a positive effect of HHIs on margins. For example, if HHI in a market increases

percent in response to a ten percent increase in price, the elasticity of demand would equal one half (in absolute value).

⁹ See Waterson, M. (1984), *ECONOMIC THEORY OF THE INDUSTRY* 23 (Cambridge University Press).

¹⁰ See Martin, S. (1993), *ADVANCED INDUSTRIAL ECONOMICS*, Oxford: Blackwell, Chapter 2.

over time, so too would price-cost margins. Conversely, if HHI were to decrease, then margins would decrease as well. In a static comparison of HHIs and margins across markets at the same time, markets with higher HHIs should have higher price-cost margins, with the converse holding as well.

24. Last, firms may set prices independently, acting as Bertrand competitors who make no allowances for the pricing actions of their rivals, with the resulting competitive prices equal to marginal costs. With Bertrand behavior, the price-cost margin is determined by HHI multiplied by a term indicating that firms expect their rivals not to cooperate in restricting output, so that if a firm decreases output by one unit, other firms will increase output by one unit in aggregate. With Bertrand price-setting, price-cost margins always equal zero (assuming there are at least two firms) since the competitive price equals marginal cost.

25. The equality of price and marginal cost with Bertrand competitors holds whether a market is examined in a dynamic or static manner. That is, the competitive price will be observed both over time in one market, as well as at a single time in one or more markets, as long as the HHI is less than one (indicating a monopoly). The strict Bertrand prediction is that if the HHI in a market were to fall from one to a lower value, indicating the entry of a second firm, then the price-cost margin should immediately collapse from the monopoly level to the competitive level. More likely, as the number of firms increases from one to two or three, normal market frictions could prevent an immediate decrease in price from the monopoly level to the competitive level. It is reasonable to expect, however, that for a range in the number of firms from, say, two to four, that at some unpredictable point as the number of firms increases, there would result a precipitous decrease in prices, causing margins to approach the zero level predicted by the Bertrand model.

26. Insight into the nature of the monopoly, non-cooperative, and competitive models can be gained by considering how market concentration and the elasticity of demand affects price-cost margins in each of the models. Taking them in order, the monopoly or tacit collusion price-cost margin depends on the elasticity of demand, but not on the HHI, as illustrated in Table Three. (The table assumes all elasticities of demand exceed one (in absolute value) because a

monopolist can always earn higher profits by raising its price to move out of the inelastic portion of the market demand curve.) As shown in the table, the higher the elasticity of demand, or more price-sensitive are customers, the lower is the monopolist's profit-maximizing price-cost margin.

TABLE THREE
MONOPOLY (TACIT COLLUSION) PRICE-COST MARGINS FOR
DIFFERENT ELASTICITIES OF DEMAND

Price-Cost Margin	Elasticity of Demand
0.67	-1.5
0.50	-2.0
0.33	-3.0

27. The non-cooperative, Cournot price-cost margin depends on HHI and the elasticity of demand. The first two rows of Table Four illustrate that lower HHI values produce lower price-cost margins, holding constant the elasticity of demand. The second and third rows of the table illustrate that higher elasticities of demand produce lower price-cost margins, holding constant the HHI.

TABLE FOUR
NON-COOPERATIVE (COURNOT) PRICE-COST MARGINS FOR
DIFFERENT HHIs ELASTICITIES OF DEMAND

Price-Cost Margin	HHI	Elasticity of Demand
0.250	0.50	-2.0
0.125	0.25	-2.0
0.083	0.25	-3.0

28. Finally, competitive or Bertrand price-cost margins equal the monopoly outcome if there is only one firm. However, if there are two or more firms, Bertrand price-cost margins do not depend on either the HHI or the elasticity of demand since they equal zero in any case. The first row of Table Five illustrates that an HHI of one yields the monopoly outcome, but rows two and three show that as soon as the HHI falls below one, price-cost margin equals zero regardless of the elasticity of demand.

TABLE FIVE
COMPETITIVE (BERTRAND) PRICE-COST MARGINS FOR
DIFFERENT HHIS AND THE SAME ELASTICITY OF DEMAND

Price-Cost Margin	HHI	Elasticity of Demand
0.50	1.0	-2.0
0.0	0.9	-2.0
0.0	0.9	-3.0

29. The tacit collusion, Cournot, and Bertrand hypotheses regarding the expected effects of HHIs on margins can be summarized as follows: the dynamics of price competitiveness in a market depend on the “toughness” of the interfirm price-setting relationship.¹¹ That is, how prices in a market change over time in response to changes in HHI depends on the “toughness” of price competition. Collusive price-setting relationships among firms lead to different patterns of price-cost margins than do competitive price-setting relationships, for the same changes in HHI. By taking into account these differences in predicted movements in price-cost margins both over

¹¹ See MacAvoy, P. (1995), *Tacit Collusion Under Regulation in the Pricing of Interstate Long-Distance Telephone Services*, 4 JOURNAL OF ECONOMICS AND MANAGEMENT STRATEGY 147. See also Bresnahan, T. (1992), *Sutton's Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration*, 23 RAND JOURNAL OF ECONOMICS 141.

time in one market (a dynamic viewpoint) and at the same time across markets (a static viewpoint), hypotheses of competition or collusion can be accepted or rejected.

A. *Market Conditions that Facilitate Tacit Collusion*

30. Tacit collusion among firms is facilitated by the presence of certain market conditions. One important condition is the ability to know rivals' price changes before they go into effect. Consider the problem faced by a cartel attempting to prevent a member firm from chiseling by decreasing its price below the cartel price so as to capture sales from other, loyal cartel members. As my previous research into firms' price-setting behavior has shown, the longer is the lag in time before loyal members of the cartel learn of the cheater's price cut, the more difficult it is for the cartel to prevent defection of firms.¹² If cartel members could learn of any price cuts prior to their being offered to customers, this would make it easier for the cartel to prevent defection by cheaters.

31. The price notification feature inherent in FCC tariff-filing requirements for international telecommunications services originating in the United States enables carriers to learn of rivals' price cuts before they go into effect. The FCC has recognized since at least 1982 that its tariffing process under section 203 of the Communications Act suppresses price competition among common carriers.¹³ The Commission's concerns follow from the fact that the process requires that terms and conditions of carrier service offerings be published before the services are

¹² Orr, D. and MacAvoy, P. (1965), *Price Strategies to Promote Cartel Stability*, 32 *ECONOMICA* 186. General conditions are provided in Table Two of the *ECONOMICA* paper such that three equal-size firms or their equivalent (i.e., $HHI = 0.33$) can achieve stable, tacit collusion.

¹³ Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, Fourth Report and Order, 91 F.C.C. 2d 59, 65 (1982).

provided,¹⁴ and that carriers cannot deviate from tariffed prices for any service.¹⁵ For example, under the FCC's tariffing process for international services, AT&T must file tariffs forty-five days before they go into effect, while MCI and Sprint must wait fourteen days. In an effort to remove the disincentives this system provided to independent price initiatives of one of the carriers, the Commission in 1983 attempted to allow permissive detariffing for facilities-based carriers other than AT&T.¹⁶ The new policy enabled MCI and Sprint to avoid filing tariffs, an opportunity however they chose to ignore. Indeed, MCI appealed a 1985 FCC decision abolishing permissive detariffing.¹⁷ The saga of the Commission's efforts to eliminate the anti-competitive effects of its own tariff policies came to an end recently when the United States Supreme Court ruled that the Commission did not have authority under the Communications Act to permit carriers to avoid filing tariffs.¹⁸ Thus, the support that publicly filed tariffs have given to preventing independent price initiatives in selected markets has been strengthened in the 1990s.

32. Tacitly collusive price setting among firms is easier to accomplish if firms' market shares become more equal or symmetric over time. When firms' shares have large disparities, large firms have more to gain from maintaining high prices to their large base of customers than from discounting to prevent market share erosion. Similarly, small firms generally have more to gain from undercutting the dominant carrier's price to gain market share than from charging

¹⁴ 47 United States § 203(a) ("Every common carrier . . . shall . . . file with the Commission and print and keep open for public inspection schedules showing all charges for itself . . . for interstate and foreign wire or radio communication. . . .") Tariffs can be viewed by the general public Monday through Friday, 1:30 p.m. to 4:30 p.m. in the FCC's Tariff Reference Room.

¹⁵ *Id.* § 203(c).

¹⁶ Policies and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorizations Therefor, Fourth Report and Order, 95 F.C.C.2d 554 (1983).

¹⁷ *MCI Telecommunications Corp. v. FCC*, 765 F. 2d 1186 (D.C. Cir. 1985).

¹⁸ *See MCI Telecommunications Corp. v. AT&T*, 114 S.Ct. 2223 (1994).

higher prices and sacrificing growth of firm share. However, as firms' market shares become more equal, the large firm has a stronger incentive to prevent further loss of share and so can credibly threaten to lower prices in response to undercutting by its smaller rivals. They, in turn, have a stronger incentive to match the dominant firm's prices since they earn profits on a larger base of customers.

33. Firms adopting a strategy of maintaining market shares can achieve prices above the competitive level.¹⁹ When firms' market shares converge over time, they can succeed in tacitly collusive pricing not previously possible. One factor that prevents firms from tacitly colluding is the difficulty of diagnosing why market shares have realigned. A decrease in market share may be interpreted by a firm as an indication that one or more other firms must have cut price to capture some of its share. When firms disagree on appropriate shares, they encounter difficulties in agreeing on a narrow range of similar, non-competitive prices. But if market shares tend toward stability at more equal levels, asymmetries in strategy on shares diminish, enhancing the ability of firms to agree on how market demand should be divided.

34. When tacitly collusive firms can agree on a stable set of market shares, each firm can set approximately the monopoly price, despite the fact that three or more firms provide the same services in a well-defined economic market. This can be shown by first considering how a monopolist sets prices across markets, and then considering the implications for a set of tacitly collusive firms.

35. As shown in Table Two, the HHIs for the selected international country pairs show that market concentration declined in the period 1985 to 1993, primarily because MCI and Sprint gained market share from AT&T during this period. This dynamic pattern of market shares differs somewhat from that observed in domestic United States markets for interstate, long-

¹⁹ Affidavit of Paul W. MacAvoy, UNITED STATES OF AMERICA v. WESTERN ELECTRIC COMPANY, INC., AND AMERICAN TELEPHONE AND TELEGRAPH COMPANY, Civ. No. 82-0192 (HHG), July 6, 1994, at 25-29.

distance services. As discussed in two of my prior affidavits,²⁰ AT&T's loss of market share in United States interstate markets for MTS and WATS services slowed by 1990, so the resulting HHIs stabilized. In the international markets under consideration in the present statement, AT&T's share continued to fall through 1993. This decline would predictably have the effect of increasing the credibility of threats by AT&T to drop prices to prevent further erosion of market share. As the shares of MCI and Sprint grew, their willingness to engage in aggressive price cutting declined because they earned high price-cost margins (shown below) over larger numbers of customers. Thus, the convergence of firm market shares in United States international markets could support the ability of the three firms to establish prices in a tacitly collusive manner, as previously observed in markets for United States interstate long-distance services.²¹

36. If firms have similar cost levels, their ability to collude tacitly is facilitated. When firms' cost levels differ, relatively low-cost firms will desire to supply more than relatively high-cost firms. This can prove a disruptive influence on an attempt to share a market by stabilizing market shares. In the case of telecommunications firms competing in international markets, however, their costs tend to be substantially the same since, as discussed in section IV, they pay the same costs for access.²²

²⁰ Affidavit of Paul W. MacAvoy, UNITED STATES OF AMERICA v. WESTERN ELECTRIC COMPANY, INC., AND AMERICAN TELEPHONE AND TELEGRAPH COMPANY, Civ. No. 82-0192 (HHG), July 6, 1994. Affidavit of Paul W. MacAvoy, In Support of Pacific Telesis Group's Request for a Waiver to Permit It to Provide Interexchange Services to Customers in California, UNITED STATES OF AMERICA v. WESTERN ELECTRIC COMPANY, INC., AND AMERICAN TELEPHONE AND TELEGRAPH COMPANY, Civ. No. 82-0192 (HHG). See also MacAvoy, P. (1995), *Tacit Collusion Under Regulation in the Pricing of Interstate Long-Distance Telephone Services*, 4 JOURNAL OF ECONOMICS AND MANAGEMENT STRATEGY 147.

²¹ *Id.*

²² As discussed in section IV, carriers' marginal costs can differ as a result of the international settlements process for recovering the costs of terminating calls.

37. Homogeneous products or services also facilitate the ability of firms to collude because they need only agree on one collusive price. Firms offering differentiated products could also agree, in principle, on one price, but their task is more difficult since each firm will have a different profit-maximizing price depending on customers' demands for its particular version of the product. Product differentiation is not an issue in the provision of international telecommunications services, however, since carriers offer substantially the same services.

38. Finally, barriers to new entry clearly facilitate collusive price setting since they eliminate the ability of entrants to offer service at rates below the collusive level. Collusive prices serve as an inducement to rival firms to enter in an effort to earn profits in excess of the competitive level. Barriers to entry can prevent such entry, preserving and protecting the ability of incumbent firms to exercise market power in the first instance. The Commission's policy proposal regarding conditions under which foreign carriers can offer facilities-based, international services in the United States will act as a barrier to entry. In addition, the current prohibition on the ability of the Bell Operating Companies to enter long-distance markets is another example of a regulatory-induced barrier to entry. Finally, there are other barriers to entry such as negotiation of operating agreements with foreign carriers in each country and gaining participation in international fiber-optic cable consortia.

IV. EVIDENCE ON THE EXTENT OF COMPETITION IN SELECTED INTERNATIONAL TELECOMMUNICATIONS MARKETS

39. The next step in my analysis of the competitiveness of United States international telecommunications markets is to determine carriers' prices and marginal costs and then calculate their price-cost margins. Hypotheses regarding the "toughness" of firm price-setting behavior can then be tested with both dynamic and static evidence on firms' price-cost margins and market HHIs for standard IMTS, discount IMTS, and IWATS services.

A. Calculation of Carriers' Standard IMTS, Discount IMTS, and IWATS Prices

40. Carriers' prices per minute for standard IMTS, discount IMTS, and IWATS calls were calculated from their FCC tariffs (all the prices are shown in Appendix Three).²³ Carriers' prices for outbound international services are readily available since IMTS and IWATS schedules must be filed in tariffs at the FCC. Carriers' rate structures for standard IMTS, discount IMTS, and IWATS have different prices for outbound international calls from the United States depending on (1) local time in the United States Eastern Standard Time ("EST") zone and (2) the destination country. In addition, discount IMTS and IWATS prices vary according to customers' monthly minutes of use.

41. With respect to the time (EST) at which calls from the United States are made, carriers have three different price categories: standard, discount, and economy (from most to least expensive). An example of the pricing categories for calls from the United States to the United Kingdom is shown in Table Six. As shown in the table, if local time in the United States is between 7 a.m. and 1 p.m. EST, then a call to the United Kingdom is charged according to the standard time rate. Because of the five-hour time difference between the United States East Coast and the United Kingdom, a call made during the standard period arrives between 12 p.m. and 6 p.m. local time in the United Kingdom.

²³ Rates were calculated based on tariffs obtained from the FCC.

TABLE SIX
PRICING CATEGORIES FOR CALLS
FROM THE UNITED STATES TO THE UNITED KINGDOM

	Standard	Discount	Economy
Local time in Eastern Standard Time Zone	7 a.m. to 1 p.m.	1 p.m. to 6 p.m.	6 p.m. to 7 a.m.
Local time in United Kingdom	12 p.m. to 6 p.m.	6 p.m. to 11 p.m.	11 p.m. to 12 p.m.

42. For each of the eight foreign countries, assumptions were made regarding the percentage of IMTS and IWATS calls in each of the three price categories.²⁴ The assumptions were based on considerations of the likely times in which residential customers would make IMTS calls and business customers would make IWATS calls. For example, for standard and discount IMTS calls from the United States to the United Kingdom, calls were assumed to be distributed as follows: 30 percent of all calls made during the standard period; 50 percent of all calls during the discount period; and 20 percent of all calls during the economy period. This calling pattern was based on the assumption that residential customers in the United States calling the United Kingdom would make most of their calls during the discount period because that period was mutually convenient for both parties. Notice, for example, that calling during the low-price, economy period is difficult for United States callers because at 6:00 p.m. EST, the local time in the United Kingdom is 11:00 p.m. Practical considerations of this sort guided the development of the assumed time-of-day usage levels.

43. In addition to the base case time-of-day assumptions (shown in Table One of Appendix Four), two other assumptions regarding the percentage of calls made during standard, economy, and discount periods were used for standard IMTS, discount IMTS, and IWATS for

²⁴ Details of the calling-pattern assumptions are shown in Tables One and Two of Appendix Four.

each of the eight country pairs to test how prices and price-cost margins varied. As shown in Appendix Four, my conclusions regarding the extent of price competition in these international markets are not sensitive to time-of-day calling assumptions

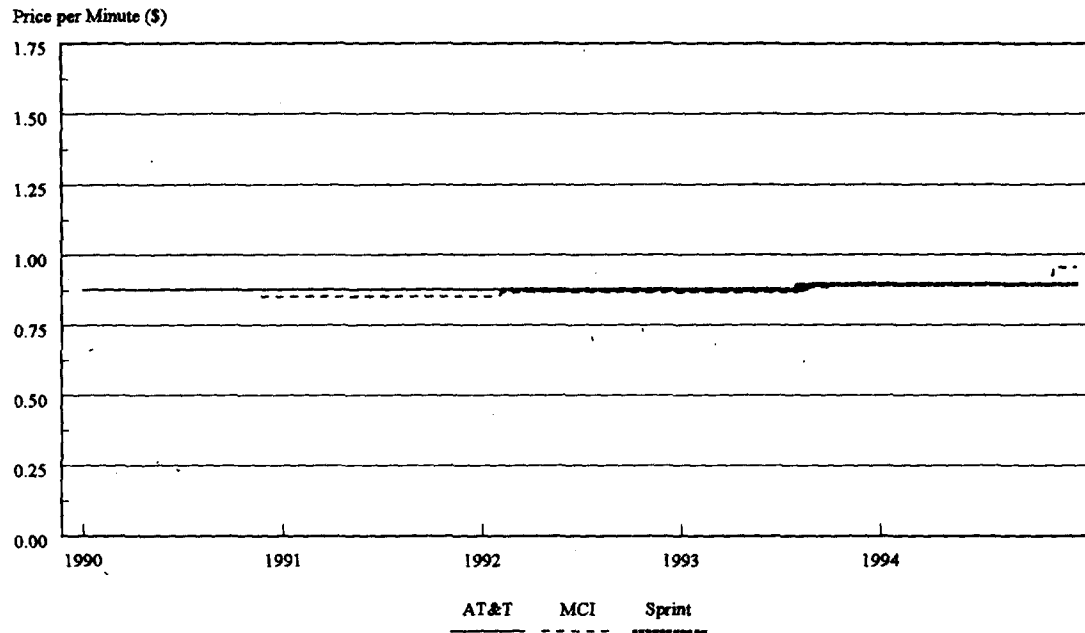
44. In addition to varying by time-of-day, rates for discount IMTS and IWATS services vary according to the number of minutes customers place calls, with discounts for more minutes of use. Prices for IMTS discount plans were calculated by assuming a monthly usage level of 50 minutes of international calls.²⁵ IWATS prices were calculated using an assumed usage level of 200 hours per month.²⁶ As shown in Appendix Four, the conclusions of this statement are not affected by assumptions regarding customers' minutes of use.

45. As an example of standard IMTS prices, consider the United States to United Kingdom prices shown in Figure One. (Standard IMTS prices for all the country pairs are shown in Figures One to Eight in Appendix Three.) Prices charged by AT&T, MCI, and Sprint for standard IMTS service were essentially identical at \$0.89 per minute by 1993. Standard IMTS prices for the other country pairs also generally increased gradually or remained constant, with the exceptions of Italy and the Dominican Republic where prices increased more rapidly.

²⁵ In addition, two other usage levels (30 minutes and 100 minutes per month) were used to calculate the prices of international discount IMTS services (see Appendix Four).

²⁶ An alternative usage level of 1,000 hours of IWATS calls per month was also used (see Appendix Four).

FIGURE ONE
STANDARD IMTS INDEX PRICES FOR
LONG-DISTANCE CALLS FROM UNITED STATES TO UNITED KINGDOM
(30% STANDARD, 50% DISCOUNT, AND 20% ECONOMY)



46. With respect to discount IMTS plans, AT&T offers a discount calling plan called *Reach Out-World* for international callers in which customers pay a \$3.00 monthly usage charge which entitles them to lower rates on calls to any international direct-dial country during certain times of day.²⁷ MCI offers discounted international rates to its customers through its *MCI Friends Around the World Anytime* plan. Participation in this plan requires a \$3.00 monthly usage fee and provides a choice of discount options.²⁸ Sprint offers an international discount plan

²⁷ The three discount IMTS plans examined in this statement began at different dates. For example, for calls from the United States to the United Kingdom, AT&T's *Reach Out-World* plan began in February 1994; MCI's *MCI Friends Around the World Anytime* began in January 1993; and Sprint's *Sprint World* plan began in February 1992. In some instances, the carriers offered more restrictive discount IMTS plans prior to the introduction of the three plans examined here.

²⁸ Customers can either designate three international phone numbers eligible for a 25 percent discount or select one international country and receive a 20 percent discount for calls to that country. Customers may change the three eligible phone numbers or the country chosen as many times as they wish, but no more than once per monthly billing cycle. Discounts apply to the first (continued...)